Doelter[8] describes a number of syntheses of rock forming minerals and a series of experiments relating to the influence of mineralizers in the production of rock components. The descriptions close with remarks on the conclusions of petographic interest that may be deduced from the experiments.

The same author[9] declares as the result of microscopic and field studies that the granite of the Bachergebirge is an intrusive rock although it possesses gneissoid features. On maps of the district a granite porphyry is separated from the normal granite in coloring. This the author believes to be a mistake, as the two rocks are parts of the same magma.

The Koralps[10] are composed of mica-schists, interlaminated with amphibolites, eklogites, marbles and gneissic pegmatites. The mica-schists are overlain by phyllites and green schists. The pegmatites are of three kinds—a schistose aggregate of large tourmalines and feldspars, a granular aggregate of tourmaline, quartz and a little feldspar, and a massive quartz-rock containing a little tourmaline and feldspar. The amphibolites are in part garnetiferous.

GEOLOGY AND PALEONTOLOGY.

Rocks of the Antarctic Continent.—The rock specimens obtained by W. S. Bruce from floating ice and the stomach of Penguins in the Antarctic seas have been examined by Prof. Geikie, who makes the following report:

The larger specimens are all basalt, and contain a good deal of olivine. The small fragments are also mostly basalt, with some trachyte. All the specimens are what one finds upon the coasts of a region composed of igneous rocks. There was no trace of sedimentary or schistose rocks among the samples.

The marine deposits obtained by Mr. Bruce off the eastern extremity of Joinville Island were determined by John Murray and Robert Irvine. The specimens came from depths of 130 to 235 fathoms. They consist of fragments of polyzoa, basaltic gravel, basaltic and quartz sand, and blue mud. The latter contains mineral particles, which indicate that on the adjoining land will be found true continental rocks. (Geog. Journ., 1896.)

[8] Neues Jahrb. f. Min., etc., 1897, I, p. 1.

[9] Mitth. des Naturw. v. f. Steiermark, 1894.

[10] Doelter, Ib., 1895.

Queries on Rock Differentiation.—The theory of the differentiation of rock magmas, now so generally held by lithologists, is questioned by Mr. G. F. Becker. The following is an abstract of his discussion of the subject:

"All known processes by which the segregation or differentiation of a fluid magma could take place involve molecular flow. This is demonstrably an excessively slow process, excepting for distances not exceeding a few centimeters. Soret's method, even if it were not too slow, seems inapplicable, because it involves a temperature unaccountably decreasing with depth. The normal variation of temperature, an increase with distance from the surface, would be fatal to such segregation. The least objectionable method of segregation would be the separation of a magma into immiscible fractions; but this seems to involve a superheated, very fluid magma, while the law of fusion and the distribution of phenocrysts in rocks indicate that magmas prior to eruption are not superheated to any considerable extent, and are very viscous.

"The homogeneity of vast subterranean masses called for by the hypothesis of differentiation is unproved and improbable. The differences between well-defined rock types are more probably due to original and persistent heterogeneity in the composition of the globe. Hypogeal fusion and eruption tend rather to mingling than to segregation, and transitional rock varieties are not improbably mere fortuitous mixtures of the diverse primitive, relatively small masses of which the lithoid shell of the earth was built up." (Amer. Journ. Sci., 1896.)

The Coal Measures of Arkansas.—The descriptions of marine fossils from the Coal Measures of Arkansas, by Mr. J. P. Smith, are of especial interest, since they afford means of correlating strata of different regions, and also because marine fossils are usually rare in the Coal Measures. Among the important finds are two species of Pronorites, to which the writer refers as follows:

"The finding of Pronorites in Arkansas is of great importance, since it is the ancestor of a form, Medlicottia, which, though unknown in Arkansas, has been found at no great distance, in the Texas Permian. These occurrences help to prove the continuity of life from the Carboniferous into the Permian, and to show that the same conditions existed here as in the Artinsk region of the Ural Mountains, where the Carboniferous beds contain the goniatites, out of which most of the Permian ammonites were developed."

The relations of the strata in which these fossils were found to the Coal Measures in both the Old World and the New is shown in a cor-

relation table accompanying the descriptions. (Proceeds. Amer. Philos. Soc., XXXV, 1896.)

The Lead and Zinc of Iowa.—In a report on the Lead and Zinc Deposits of Iowa, Mr. A. G. Leonard states that these ores occur in crevices in the Galena limestone in the northeastern part of the State, in what is known as the driftless area. Contrary to the general rule, that ore deposits are found with areas of disturbance in the earth's crust, the ore deposits of the upper Mississippi are found in strata which show no evidences of having been subjected to dynamic forces. The author accepts Chamberlain's theory as to the localization of these ores, viz., currents of the old Silurian sea. The oceanic waters impregnated with metallic salts derived from the leaching of the adjacent lands were borne by currents to areas where there was an abundance of organic life, and here the metals would be extracted and thrown down along with the sediments. As to the filling of the crevices, he adopts the lateral secretion theory, as being more in accord with his observations. (Iowa Geol. Surv., Vol. VI, 1896.)

The Eruptive History of the Yellowstone Park.—Mr. Hague collates a series of facts to demonstrate that the pouring out of igneous rocks in the Yellowstone Park began with the post-Laramie uplift, or closely followed it, the outflow continuing with greater or less energy throughout Tertiary time. The great value of paleobotany as an aid in determining the age of geological formations is illustrated in this region. At least five distinct and important geological periods are defined by their fossil flora, of which four are exposed in the park within a few miles of each other.

The following table shows the relationships between the different geological formations and the floras which characterize them:

Formations.	Flora.	Age.
Basic breccia	Lamar	Upper Miocene.
Intermediate breccias	Intermediate Flora	Lower Miocene.
Acid breccia	Fort Union	Eocene.
Agglomerates, Waterlain	Livingstone	Cretaceous.
Igneous Material.		
Sandstone	Laramie	Cretaceous.

(Amer. Journ. Science, 1896.)

The Atlantic Coast Eocene.—A study of the Middle Atlantic Coast Plain, with a view to its correlation with the Gulf region, by Wm. B. Clark, has recently been published by the U. S. Geol. Surv. The author reviews critically the characteristics of the Eocene strata as developed in the States of Delaware, Maryland and Virginia. While the geological and stratigraphical data are examined with care, it is the paleontological record to which is given the most attention. Accordingly the report includes an exhaustive study of the fauna of the region under discussion, together with a critical review of the species described by previous authors, as well as the description of a number of new forms.

Briefly stated, the Eocene deposits of the Middle Slope are typically glauconitic, with an average thickness somewhat in excess of 200 feet. The organic remains consist largely of shells of mollusks, whose appearance indicates that they were but slightly disturbed prior to their burial in the sediments in which they are now found.

The fact that the strata are so largely made up of secondary materials shows that the position of accumulation was in the vicinity of a coast reached by no large rivers bearing sediment, while also, for the most part, sufficiently removed from the coast-line to be unaffected by shore conditions. These deposits, also, were very slowly accumulated. These conditions were markedly different from those prevailing in the Gulf region. There numerous large rivers discharged great quantities of material, so that the strata of the Middle Atlantic Slope must be represented in the Gulf by deposits many times their thickness.

After considering all the facts, the writer is decidedly of the opinion, "that the deposits under discussion represent the greater portion of the Eocene series of the Gulf, its upper members excepted. Compared with the section originally described by Prof. E. A. Smith, in the Alabama area, it undoubtedly comprises all or the major part of the Lignitic, Buhrstone and Claiborne, and, perhaps, also portions of higher horizons; but, regarding this latter point the necessary paleontological evidence is wanting. The reference does not, however, necessarily involve the assumption that the basal beds of the Potomac section are the exact equivalents of the Lignitic, since deposition may have commenced somewhat earlier than in the other, although the difference in time was not great." (Bull. U. S. Geol. Surv., No. 141, 1896.)

Glacio-Marine Beds of Europe.—Among the important observations made by Col. H. W. Fielden during his recent explorations of Arctic Europe was one concerning the deposition of glacio-marine beds. Owing to the rapid elevation of the Spitzbergen region, it is

possible to examine in detail the immense deposits originally formed in front of glaciers. These deposits now lie between the present shore-line and the edge of the glacier of to-day. The author instances a formation of this nature to be found at the head of Green Harbor, one of the minor indentations on the southern side of Ice Fiord, and describes it as follows:

"The front of the glacier that now occupies the valley is about a mile distant from the present shore-line. Fronting this glacier, the terminal face of which is about 50 feet in height, and extending for 1½ miles in length, is a range of some 50 to 70 feet high and ½ mile in width. These hills have undergone much subærial erosion, and channels have been cut in them by the numerous streams issuing from under the glacier. Following up one of these water courses, which average from 25 to 50 yards across, with a very level bottom, we find sections of mud and clay rising like walls on either side to a height of 50 to 60 feet. These beds contain numerous stones, but do not show any signs of stratification; in them I found shells of *Mya truncata*. That these beds are of submarine formation is confirmed by the existence of raised beaches in neighboring fiords and along the adjacent line of coast, at a higher level than the beds I am now describing. Between the present face of the glacier and the perpendicular wall of the mud-hills runs a sort of ditch, dry moat, or open space, some 30 yards in width, along the entire front of the glacier. The bottom of this ditch is thickly strewn with morainic débris, composed of rounded ice-worn stones, many being deeply grooved, scarred and scratched. Through this slope of rocks and stones glacier streams were pouring forth."

The author suggests, that since this process of rock accumulation probably went on when the glacier projected in the sea, that during the emergence period there would come a time when the bay-ice would freeze deep enough to incorporate the boulders of the moraine, and quantities of ice-scratched and ice-polished stones would be floated away on the breaking up of the bay-ice in the spring. This would explain the occurrence of the vast number of scratched erratics found in the glacio-marine beds of Kolgnev Island.

Observations made in Greenland show that in the neighborhood of glaciers discharging into the sea the water is charged with sediment, and the ship's anchor when lifted in front of some of these glaciers brings up a heavy weight of unctuous mud, thus confirming the theory that "water issuing from under a glacier in Polar regions, and discharging from under the ice into the sea, can lay down glacio-marine beds in the ocean," and the occurrence of ice-scratched stones through-

out these beds is also accounted for. (Quart. Journ. Geol. Soc., Pt. 4, 1896.)

Geological News.—Mr. R. P. Whitfield notes a new genus of Phyllocaridæ from the Lower Helderberg, near Waubeka, Wisconsin. He proposes the name *Entomocaris*, from the resemblance of the carapace to that of an ostracode entomostracan. (Bull. Amer. Mus. Nat. Hist., 1896.)

A recent paper by Mr. F. A. Bather gives a morphological description of *Uintacrinus socialis*, and discusses the relations of the genus to certain Paleozoic crinoids. He shows that Uintacrinus cannot be related either to the Camerata, as Jaekel has supposed, or to the Ichthyocrinidæ, as maintained by Von Zittel, Neumayer, and others. By a process of comparison and elimination he finally determines that of all the known genera Dadocrinus is probably the most nearly related to the ancestor of Uintacrinus. (Proceeds. London Zool. Soc. (1895) 1896.)

A new genus of fossil birds is reported from the Pliocene of South Australia. The specimens consisting of portions of a dozen birds were found at lake Collabonna. They are described by Messrs. Stirling and Lietz under the name *Genyornis newtonii*. The generic name refers to the conspicuous feature afforded by the relatively large size of the lower mandible. The femur indicates a gigantic bird, its dimensions surpassing those of *Pachyornis elephantopus*, and nearly equalling those of *Dinornis maximus*. (Trans. Roy. Soc. South Austral., XX, 1896.)

According to Lydekker, the affinities of the so-called extinct Giant Dormouse (*Myoxus melitensis*) are not with the Myoxidæ, but with the Sciuromorpha. He suggests for it the new generic title *Leithia*, defining the genus, and figures its type of dentition. (Proceeds. Zool. Soc. London, 1895.)

BOTANY.[1]

Long Stolons of Phragmites.—Several years ago some remarkable specimens of a running grass were brought to me from the islands of the Platte River in Central Nebraska. Although quite puzzling at first they were soon found to belong to the common Reed Grass (*Phragmites phragmites* [L.] Karsten). Some of the specimens were of astonishing length, one measuring a little more than seventeen meters! At every

[1] Edited by Prof. C. E. Bessey, University of Nebraska, Lincoln, Nebraska.